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A REVIEW OF THE EARLY VACCINATION CONTROVERSY WITH AN ORIGINAL LETTER BY JENNER REFERRING TO IT, AND TO THE SPREAD OF VACCINATION TO THE SPANISH POSSESSIONS OF AMERICA, THE PHILIPPINES, AND OTHER EUROPEAN SETTLEMENTS IN THE ORIENT.

By PHILIP KING BROWN, M. D., San Francisco Polyclinic.

No sooner had Edward Jenner proposed the practice of vaccination as a preventive for smallpox than there arose in England a controversy as to its safety and efficiency which has been endemic ever since, interrupted by more or less violent epidemic outbreaks. Nor has the controversy been confined to the home of its birth, for we find it more than a century later in full flower even in the classic hamlets of our own state.

The humor of the situation reveals itself in the analysis of the present state of the controversy in which it is clear that the anti-vaccinationists have contributed no new argument in that more than hundred intervening years, whereas science has shown that whatever little claim they had to a hearing was based on misrepresentations now well understood and revealing no truth in favor of their contention. The 10th Edition of the Encyclopedia Britannica in an article on vaccination presents only an unintelligent arraignment of

the method unworthy of a place even in the earliest edition. In a short biography of Jenner closing with an apologetic paragraph, is the only meagre account of Jenner's great discovery. The 11th edition gives a fairly satisfactory historical review of the established facts of vaccination.

In presenting to you the status of the controversy as defined within the first few years of Jenner's announcement of his discovery, I have reviewed articles published at the time and especially those referred to in one of Jenner's letters to a friend, which letter fell into my hands through a collector and which reads as follows:

Cheltenham, 22 Nov., 1806.

The Rev. Mr. Dibbin,
Kensington.

My dear Sir:

I have seen the Edinburgh Review, and a most gratifying sight it was. Moseley and his adherents had before called down many a pelting storm upon their heads, but this tornado must I think annihilate them. The author or authors are perhaps not perfectly conscious of the immensity of good they have done. The Pen of Moseley, I am confident, has slain more than the sword of Bonaparte. This admirable Critique should be universally read. But this cannot be expected while it is exhibited in its present shape only; and I am at a loss to know how it can obtain circulation in a detach'd form. But among your brethren of the Press you will soon I imagine be able to tell me. It should pursue Moseley's book in all directions, as an antidote to its Poison.

Woodbine Cottage looks beautiful even in death, for Winter has apparently killed all its vegetable ornaments. Our Fd. is going on—Mount Pleas-

ant is now the favorite object. This is a lovely Meadow and commands one of the richest prospects around this favor'd spot. Here you will ere long see a Magnificent Reunion. Pruen's taste is more conspicuous in architecture than in ornamental gardening. The latter, which is a species of Landscape Painting requires much Time and study to produce correct specimens. The taste of Ferryman is far beyond that of any one existing or that even did exist, according to my notions, in laying out ground.

I hear with extreme delight that my poor dear Swann is better—God grant it may be true—I have a thousand fears about him. If you don't come and see us, write soon, I beg you.

My best respects to Mrs. Dibbin.
truly yours,

E. JENNER.

P. S.—I have just received from Madrid the most interesting document that has ever reached me on the vaccine subject. It comes in the form of "Suplemento a la Gazette de Madrid" and gives a detailed account of an expedition fitted out by order of his Catholic Majesty for the sole purpose of propagating the vaccine in all his foreign possessions and many other parts of the world. The expedition sailed in 1803 and returned in 1806. I will send you a copy of the Gazette and a translation. I don't imagine the annals of history furnish an example of philanthropy so noble, so extensive, as this.

The article referred to was entitled "On Vaccine Inoculation" by Robert Willan, M. D., and others, and is a masterly criticism in the Edinburgh Review, Vol. 9, 1806-7, pp. 32-66. A certified copy of the supplement of the Madrid Gazette for October 14, 1806, giving a brief account

of Charles IV's expedition, I succeeded in securing through the American embassy at Madrid, from the National Library, and it was translated, preserving the style of expression, by Mdme. I. M. de Reygadas. The former article is quoted from freely, in this paper, and the latter is presented in full.

It must be borne in mind that the controversy of a hundred years ago did not confine itself to the merits of cow-pox vaccination as a preventive to small-pox. The great issue was whether cow-pox really was as safe and effective in establishing immunity as direct inoculation of small-pox and as to whether it did not introduce into the system "bestial humors," "strange mutations of human character from quadrupedan sympathy," scrofula, malignant ulcers, etc.

Inoculation of small-pox as a preventive measure is spoken of by even anti-vaccinationists of that period as a most noble and blessed discovery as it diminished the hazard to which everyone was subjected in a most important degree. For one hundred years inoculation had been in practice as a preventive to small-pox,—that is, the disease itself was transferred from case to case, it being recognized that an immunity followed recovery, and the mortality from cases so inoculated was slight as compared to that which obtained from the disease itself,—called the "natural small-pox" to distinguish it from the inoculated.

Willan writing of the situation at that period:

"Of those who have the disorder naturally, one is found to die in six. Of inoculated patients, only one dies in 250. In London, where it ought to be best ascertained, some eminent practitioners have stated the proportion to be as high as 1 in 100. The zealous anti-vaccinationists have denied it to be

greater, under judicious treatment, than 1 in 1,000. It cannot be denied, however, that besides this risk to life, the disease, even under this mitigated form, has frequently proved an exciting cause to scrophula, and other dreadful distempers, and has often been attended with blindness and deformity."

It will be clear from these statements what a frightfully high mortality attended epidemic small-pox, and its prevalence may be estimated from the data presented later by the House of Commons Committee appointed to investigate cow-pox vaccination. From a calculation made by Dr. Heberden whose name has come down to us through the association with the nodes on the joints in rheumatism, it seems that over a period of thirty years before vaccination 95 persons died of small-pox in London out of every 1000 deaths, and the annual death rate of Great Britain was upward of 40,000. This would make the number of cases of small-pox annually between 240,000, based on all the deaths being from the natural disease, to a half million if one-fortieth of the total deaths were due to the inoculated disease.

This was the status of affairs when Jenner announced the results of his observations on cow-pox and its relation to the prevention of small-pox. His own account of these observations is interesting:

"My inquiry into the nature of the cow-pox commenced upwards of twenty-five years ago. My attention to this singular disease was first excited by observing, that among those whom in the country I was frequently called upon to inoculate, many resisted every effort to give them the small-pox. These patients I found had undergone a disease they called the cow-pox, contracted by milking cows affected with a peculiar affection on their

teats. On inquiry it appeared that cow-pox had been known among the dairies time immemorial, and that a vague opinion prevailed that it was a preventive of the small-pox. This opinion I found was comparatively new among them; for all the older farmers declared they had no such idea in their earlier days: a circumstance that seemed easily accounted for, from my knowing that the common people were very rarely inoculated for the small-pox, till that practice was rendered general by the improved method introduced by the Suttons: so that the working people in the dairies were seldom put to the test of the preventive powers of the cow-pox."

During the years of investigation and experiment Jenner's hopes had been dampened by finding that some persons who had been infected from the genuine cow-pox, had, nevertheless, proved liable to variolous infection, and that one was sometimes effectually protected, when another infected from the same sore, proved liable to after-contagion. By diligent and continued observation, however, he was fortunately enabled to explain this anomaly also. He ascertained by repeated experiments, that when the pus was taken from the ulcer or sore on the cow, after a certain stage of its progress, it produced a sore in the human body of a character altogether different from that which resulted from an earlier infection, and that it was only the disorder communicated in the earlier stages of the case, and before the pus originally secreted had undergone any "change or discomposition" that had the power of shielding the patient from an infection of small-pox.

Having brought his observations so far to maturity, it occurred to Jenner to try the experiment of propagating the disease by inoculation,

first from the animal, and afterwards from one human creature to another. In the year 1796, he accordingly inoculated a young man from the hand of a milker who had the distinctive symptoms of the genuine cow-pox, and had the pleasure of finding, that, when inoculated for the small-pox, at the distance of some months, the individual completely resisted the contagion. The experiment was afterwards enlarged; and, after inoculating some hundred children, and putting them, at different intervals, to the test of a subsequent inoculation for small-pox without effect, he ventured to communicate his discovery to the world in a treatise published in 1798, which was followed up the year after by a still longer list of experiments and observations. In these works, Dr. Jenner suggested, that the disease itself was probably not original in the animal from which it took its name, and that several circumstances led him to believe that it originated from the distemper called the grease in the heels of horses, and was communicated to the cow by being milked by persons employed in dressing such horses. The cow-pox was uniformly unknown in those dairies where the milking was performed by women; and in all the instances where Dr. Jenner could trace its introduction, he found that the milkers had been recently in the habit of handling horses affected by the grease. This conjecture, it is said, was later verified by inoculating the cow from the grease directly, thereby producing the genuine form of cow-pox.

The first public opposition that was made to Jenner's report of his discovery, was in a publication of Dr. Moseley's in 1798. In this work, which was entitled, "A Dissertation on Sugars," the doctor ingeniously contrived to introduce a

violent philippic against the new practice of vaccination, in which, as he had no experience or observation on which to found his opinion, he contents himself with pouring out an immense quantity of abuse.

It was this and subsequent publications of Moseley's that called forth Jenner's statement, "Moseley's pen has killed more than Bonaparte's sword."

Following Moseley's attack, reprinted two or three times, the opposition grew quite violent. Charges of murder and falsehood were interchanged among the disputants without the smallest ceremony; the medical journals foamed with the violence of their contention; it raged in hospitals and sick chambers; and polluted, with its malignity the sanctity of the pulpit, and the harmony of convivial philanthropy.

In 1802 the subject was submitted to the consideration of a committee of the House of Commons, who after taking the evidence of Drs. Ashe, Sir W. Farquhar, Blane, Woodville, Baile, Pearson, Heberden, and thirty-two other practitioners of the first eminence in London, gave a report decidedly favorable to the new system. Out of the forty persons examined on this occasion indeed, there were only three, viz., Dr. Moseley, Dr. Rowley and Dr. Birch, who expressed any doubts of its efficacy; and at this time it is remarkable that not one of these gentlemen went beyond the expression of doubt; all the rest were decided and confident in their testimony. Dr. Woodville stated in particular, that in the last six months, he had vaccinated, at the small-pox hospital, 7,500 patients, the half of whom had been since inoculated with the small-pox matter, without the smallest effect being produced in any one instance.

Dr. Moseley himself stated that his opposition to cow-pox vaccination was founded at that time "on the basis of theory," and, two years after he had three times reprinted that miserable specimen of scurrilous buffoonery, he informed the committee of the House of Commons that he did not himself know of any instance in which it had either failed to prevent small-pox, or been followed by constitutional diseases, although he had heard of such things from persons, none of whom he could then recollect, or mention to the committee.

In 1804 Mr. Goldson of Portsmouth published six cases of small-pox occurring after vaccination, accompanied with observations calculated to shake the confidence which was now very generally placed in the security of the Jennerian inoculation. These were answered by Mr. Ring and others, who endeavored to show, that in some of his cases, Mr. Goldson's patients had not had the genuine cow-pox in the first instance, and that in others, they had not had the genuine small-pox thereafter. This part of the controversy was conducted with temper, and with a reasonable degree of candor. About this time there was issued in London a statement signed by many of the leading physicians of the time which served to quiet the controversy for a season: "Many unfounded reports having been circulated, which have a tendency to prejudice the mind of the public against the inoculation of the cow-pox, we, the undersigned physicians and surgeons, think it our duty to declare our opinion, that those persons who have had the cow-pox are perfectly safe from the infection of the small-pox. We also declare, that the inoculated cow-pox is a much milder and safer disease than the inoculated small-pox."

This certificate was signed with the respectable names of Drs. Bailie, Lettsom, Garthshore, Willan, Lister, Vaughan, Moore, and by five and twenty other physicians and surgeons of the first reputation in the metropolis.

The practical question being whether vaccination ought to be adopted in preference to inoculation with small-pox, it is evident that the question could only be decided by taking a comparative view of the advantages and disadvantages of vaccination and small-pox inoculation as pictured at the time. The arguments advanced by the two sides may be summarized briefly.

The great advantage of small-pox inoculation was that it prevented certainly, or almost certainly, the recurrence of that disorder, and that it was in general, infinitely milder than the natural form of the disease. Its disadvantages were shown to be that it is attended with considerable hazard, both to life and to the general constitution; and, that being an infectious disease, its partial adoption exposes greater numbers to the natural malady than would otherwise fall in the way of it. In consequence of this circumstance we have already seen that the total mortality by small-pox was increased nearly one-fourth after the practice of inoculation became general.

The advantages of vaccination, according to the report of its early advocates, were: (1) that the disease which it communicates is not in any degree infectious; (2) that it is as effectual a preventive of small-pox as the old inoculation; and (3) that it produces a disease infinitely milder, and less hazardous, than arose from the former practice.

Of these three invaluable properties ascribed to cow-pox by its admirers, the first was unequivocally

admitted by its opponents: the disease is universally allowed not to be infectious.

The most determined enemies of vaccination did not long pretend to deny that it prevented small-pox for a certain time, or to a certain degree. The unquestionable facts that have been accumulated by its admirers, have established that general point in the most complete and satisfactory manner. Dr. Woodville alone subjected nearly 4,000 vaccinated patients to the small-pox inoculation in the course of six months and found that everyone of them resisted the infection. That experiment was repeated probably not less than a million times, according to Willan and others, with the same result. Cow-pox, therefore, is confessedly a preventive of small-pox; and the only question is whether it will be an infallible and a permanent preventive.

The arguments on this point are of deep interest to us in light of our present vastly greater knowledge of immunity.

"It seems contrary to all analogy, and all rules of reasoning, to suppose *a priori*, that an immunity which is found to subsist for a certain time in the usual and healthful state of the system, will gradually and insensibly wear away without any apparent cause, or any sensible change to indicate its extinction; and the facts which bear at all upon the question, so far from suggesting or supporting such a supposition, seem, in our apprehension, completely to refute and discredit it. In the first place, the natural and inoculated small-pox, the measles, and the whooping-cough, which are the only other cases in which a preceding disease is found to bestow an immunity after its own cessation, are allowed to confer a permanent immunity, and not one that is gradually and silently destroyed by the

lapse of time. In the second place, the matter seems experimentally settled, by the case of natural cow-pox, in which the security has been found unimpaired and entire after the lapse of twenty, thirty, forty and fifty years. Lastly, even if we were to admit the whole of the cases of small-pox occurring after vaccination, which the enemies of the practice have founded on, we could never hold that the preventive virtue naturally wore out in a certain time, because these cases are alleged to have occurred indiscriminately at all periods after vaccination which have yet been possible. In cases of continual exposure, they are said to have taken small-pox, at all distances, from three months to seven years after vaccination. It is impossible to suppose, therefore, that the preventive power of cow-pox wears out of the human frame in a certain period of time. If the cases are to be submitted at all it would be more rational to suppose that it imparted a weak or imperfect power of resistance, which might be overcome by a powerful contagion."

The great difficulty of establishing true relations of cause and effect was keenly appreciated by the early defenders of vaccination and over this question of immunity through vaccination the fight was strongest.

The evidence that is requisite to prove or disprove any proposition in the science of medicine, is of a peculiar kind. It differs entirely from that species of proof which satisfies a court of law. Both direct and circumstantial evidence, which would leave no doubt in the breasts of judges and juries, have often not the slightest tendency to render a medical fact even probable. The declarations, and even the oaths of the most conscientious, disinterested, and able men, are all insuffi-

cient. Nor is there to-day sufficient understanding of immunity and its laws to satisfy our high standard of scientific explanation.

It is not surprising, therefore, that the question of relative immunity was an all important part of the controversy and that the attack on vaccination took the form of testimonials from all classes on this point.

This species of unintentional perjury, so large a part of modern medical advertising and controversy, was referred to by many chroniclers of Jenner's time as being very common during the 18th century in every part of Europe; and, "the more improbable the fact was, the more numerous were the affidavits and the more respectable the signatures. Clergymen, judges, and peers, are daily swearing that they have been cured of incurable diseases; but the meanest apothecary smiles with contempt, when he reads their splendid testimonials."

Willan sums up the disputed point of immunity as follows:

"The first position is, that in all, or almost all the cases where small-pox have really occurred after an alleged vaccination, the patient really never had the cow-pox, the inoculation having miscarried, by accident or inattention. The total number of such cases, we believe, is considerably under a hundred out of little less than half a million of vaccinated subjects; and, when the following particulars are attended to we are persuaded that they will appear fewer than might have been reckoned on, from the novelty, and, in some respects, the nicety, of the practice. In the first place, it is well known that within a short time after the promulgation of the discovery, a multitude of individuals, of all sexes and profes-

sions (Dr. Willan says not less than 10,000), many of whom had never seen the disorder in their lives, took upon them to practice the inoculation in all parts of the kingdom. That some mistakes should be committed by such practitioners, even in a matter of the utmost simplicity, could not excite wonder; but the truth is, that the operation was a matter of considerable nicety and not perfectly understood, even by medical practitioners, till after the publication of Dr. Jenner's full directions and engravings in 1802. The causes of mistake were various: 1st, the matter was sometimes taken from a spurious sore, in the first instance, which, though it raised a vesicle, and excited inflammation in the inoculated patient, could never, of course, communicate the genuine disease. 2nd, it is still often taken from the true sore at too late a stage of its progress, in which case, though it seldom failed to produce a very active inflammation, it could never give the true cow-pox. 3rd, the matter, though taken in proper time, was sometimes decomposed or corrupted, by being too long kept, or exposed to air, or heat or cold, or diluted in too much fluid. 4th, when all these circumstances were attended to, it sometimes happened that, owing to the existence of eruptive fever, or violent cutaneous disorders, the patient did not receive the full constitutional affection nor indicate the decided symptoms of regular vaccination. Lastly, it was some time before even the regular practitioners were so perfectly acquainted with those characteristic and decided appearances, as to be able to say with certainty whether the vaccination had actually taken effect or not." The circulation of Dr. Jenner's descriptions and engravings went far to remove this uncertainty; but it was not perhaps completely obviated till the publication of Dr. Willan's ex-



Statue to Charles IV of Spain, erected in Manila to commemorate the vaccination expedition of 1803-1806.

cellent observations, in which he described all the various forms and appearances of the spurious, as well as the true vesicle, in a way which puts it in

the power of any attentive reader, in the least degree acquainted with the subject, to attain perfect assurance in every case that can occur to him.

This is the brief history of one of the greatest contributions to preventive medicine the world has ever known. In the present age of scientific review and proving of every fact in medicine before its acceptance, it stands out as a contribution from clinical medicine based upon observation and reasoning. That Jenner extended his observations over a period of 25 years before voicing his belief publicly, commends itself to those who look for contributions to medicine from clinicians and the inductive method and who deplore the reasoning from single cases and single observations.

It must have been gratifying to Jenner to have received the account of Charles IV's expedition to Spain's American and far Eastern possessions in the interest of the promulgation of the doctrine of vaccination. At that early date (1803), following Jenner's first publication by only five years, it speaks volumes for the established efficiency of cow-pox vaccination as well as for the extent and dread of the disease which it was destined in time to reduce almost to an historical memory. Indeed, but for the interference of the ever present false and shallow prophets whose chief ability seems to be mistaking opinion for fact, it is quite probable that small-pox would long ago have become practically unknown.

The newspaper account of the expedition is given in full, for it tells in graphic way the interesting features of the expedition. I have secured a photograph of the statue erected by the Filipinos in Manila to Charles IV in commemoration of the expedition and doubtless there remain traces of it in some of the American cities visited, but

thus far I have been unable to secure any data concerning them.

SUPPLEMENT TO THE MADRID GAZETTE
OF TUESDAY, OCTOBER 14TH, 1806.

On Sunday, the 7th day of last September, was given the honor of kissing the hand of our lord the King to Dr. D. Francisco Xavier de Balmis, Honorary Surgeon of his Royal Camara, who had just returned from a voyage around the world, undertaken with the only object of carrying to all the distant Dominions of the Spanish Monarchy, and to those of diverse Nations, the inestimable gift of vaccine. His Majesty has shown the greatest interest in hearing about the principal events of the expedition, being extremely gratified with its results, which have exceeded even the hopes which were conceived at its beginning.

The expedition was composed of various members of the faculty and employees, besides twenty-two children, who had never passed through small-pox, and who were destined to preserve the precious fluid, transmitting it successively from arm to arm, and from one to the other during the voyage. The expedition left the Port of Coruna under the direction of Balmis the 30th of November, 1803. The first stop was at the Canary Islands, the second in Porto Rico, and the third in Caracas. On leaving this province through the port of La Guayra, the expedition was divided into two branches, one sailing towards Central America under charge of the sub-director, Dn. Francisco Salvani; and the other division pursuing its course under the direction of Balmis to Havana, and from there to Yucatan. At that province this branch of the expedition was again subdivided, Professor Dn. Francisco Pastor voyaging from the port of Sisal for that of Villahermosa in the Province of Tabasco to propagate the knowledge of the vaccine from the Royal City of Chiapas to Guatemala, toiling over the long and painful way full four hundred leagues to Oaxaca. In the meanwhile the rest of the expedition, which arrived safely at Vera Cruz, not only traveled

through all the Vice-Regency of New Spain, but also the internal provinces, from which it returned to Mexico, the point of reunion.

Disseminated through every part of the northern hemisphere of America as far as the coasts of Sonora and Sinaloa, and even unto the Gentiles and Neophites of the high Pimeria, the precious preservative against natural smallpox was established in every capital by means of a commission of the first authorities and the most zealous members of the faculties, who were to conserve it a sacred deposit, for which they will have to be responsible to the King and to posterity. The director then undertook to carry to Asia this part of the expedition, which had been crowned with the most brilliant success, and with it the great gift to humanity, and after overcoming many difficulties, they sailed from the port of Acapulco to the Philippines, which was the limit prescribed for them, if he could reach it.

The great and pious designs of the King being favored by Divine Providence, Balmis accomplished the voyage in a little more than two months, taking with him twenty-six children from New Spain to vaccinate them successively as had been done to the preceding ones, and as many of them were from institutions, they went under the care of the matron from the Asylum for Abandoned Children of Coruna, who in this, as in the previous voyages, attended to their cleanliness with great diligence. The expedition having arrived at the Philippines, and the specific having been propagated in the islands subject to the dominion of his Majesty, Balmis, considering his philanthropic missions now ended, decided to extend the benevolence of the King and the glory of his august name even unto the farthest confines of Asia.

And in effect the vaccine had been carried and disseminated through all the vast archipelago of the Visayas Islands, whose kings, although they had lived in perpetual war against us, have laid down their arms, overcome by the generosity of an enemy, who presented them with health and friendliness when most terribly afflicted with an epidemic of virulent smallpox. Not less grateful

were those who reigned in the Portuguese colonies and in the Empire of China when Balmis entered Macao and Canton, being able to preserve the fluid fresh and active, through the means already referred to, an undertaking which the English had never succeeded in doing on the various occasions when they made the effort, by carrying in ships of the East India Company, portions of pus, which arrived inert.

After spreading the vaccine in Canton as well as circumstances and political conditions permitted in that empire, leaving the further propagation to the care of the physicians of the English Factoria in this place, Balmis returned to Macao, and, taking passage on a Portuguese ship for Lisbon, arrived in that city the 15th day of last August. He stopped in Santa Helena, in which island he succeeded, as in every other place through exhortations and constancy, in getting the English to adopt the prodigious antidote which they had despised for the space of more than eight years, even when it was a discovery of their nation, and given to them by Jenner himself.

Of the branch of the expedition under Salvani, whose destination was Peru, it is known that they suffered shipwreck in one of the months of the Magdalen River, but found prompt succor from the natives, the immediate authorities, and the Governor of Cartagena. The sub-director, the three members of the faculty who accompanied him, and the children, with the fluid in good condition, were saved, and this latter was extended throughout the province easily and rapidly. From thence they sent it to the Isthmus of Panama, and undertaking successively (well provided with all that was necessary), the long and dangerous navigation of the Magdalen River, they stopped on both banks of the river when necessary, and went inland separately to accomplish their mission in the towns of Tenerife, Mompox, Ocana, Socorro, San Gil and Medillin, in the valley of Cucuta, and in the cities of Pamplona, Giron, Tunja, Veliz and other towns of large population, all of the members of the expedition uniting once again in Santa Fe. Everywhere they left the physicians instructed, and in the larger towns rules were given by the director,

whereby they should preserve the vaccine, which was dispensed, according to the statement of the Viceroy to fifty thousand persons, with no bad effects. In the last days of March of 1805 they made preparations to continue their travels, following different directions to visit with greater ease and speed other towns of the vice-regency situated in the direction of Popayan, Cuenca and Quito to Lima, and the following August they found themselves in Guayaquil.

Not only was the expedition able to propagate the vaccination throughout the countries of both friends and enemies, among the Moors of the Vasayas, and among the Chinese, but also to secure to posterity in the dominions of the King this benefit in perpetuity, first through the central societies established, and secondly through the discovery by Balmis of the existence of the "cowpox" or pox affecting the cows, in the valley of Atlixco, near the city of Pueblo de los Angeles; of the same discovery by his aid Dn. Antonio Gutierrez in Valladolid of Michoacan, and in the country around Calabozo of the province of Caracas, where it was found by the resident member of the faculty, Dn. Carlos de Pozo.

The great multitude of observations taken, which will shortly be published, showing the effects of the vaccine in different climates as well as its efficacy, not only in protecting from smallpox, but also curing simultaneously other diseases, will in still greater degree make manifest the great importance to all humanity of this expedition, of which there is no similar example in all history.

Although the object of the expedition was simply to communicate the vaccine from arm to arm, to instruct everywhere in this practice the members of the faculties, and to establish rules concerning its conservation, the director has omitted nothing which would make the expedition useful to science and to agriculture. He brings with him a considerable collection of exotic plants, he has caused drawings to be made of the most beautiful objects in natural history, he has collected important facts and dates, and among the list of benefits which make him worthy of the gratitude of his country, not the least is his splendid collection of

fruit trees, and other useful productions which he has brought alive, and which being propagated in similar climates of the peninsula, will make the expedition as memorable in the cause of agriculture as in that of medicine and humanity. It is hoped that the sub-director and his three assistants directed to bear the same gift to Peru, will soon return from Buenos Ayres, after they have traversed this vice-regency, that of Lima, and the districts of Chile and Caracas, and that they will bring the collections and observations acquired in following out the recommendations which were given them by the director, without allowing themselves to be distracted from their philanthropic commission, which was so earnestly recommended them by His Majesty for the benefit of the human race.

